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Amendments to the Claims

1. (previously presented) An optical multiplexing apparatus comprising:
a tunable light source for providing a light beam, the beam having a wavelength that varies periodically through a range of wavelengths at a sweep frequency rate,
a first splitting means for splitting the light beam into a signal beam and a reference beam,
a second splitting means for splitting the signal beam into at least four sub-beams;
means for imparting a distinctly different polarization state to each of the sub-beams in order to associate each of the sub-beams with a different polarization state,
means for recombining the sub-beams with different polarization states into a single optical beam;
means for interfering the single optical beam with the reference beam in order to obtain an output light signal, having an amplitude which varies in time; and
means for detecting the output light signal and resolving the output signal into frequency components thereof;
wherein the time delay for each the sub-beam is selected such that a unique frequency component of the output light signal is associated with each one of the different polarization states; and
wherein the at least four sub-beams comprise four sub-beams with four different polarization states comprising linear horizontal, linear diagonal, linear vertical, and right-hand circular.

2. (Cancelled)

3. (previously presented) The apparatus of claim 1, wherein the interfering means comprises an interferometer selected from the group consisting of a Mach Zehnder interferometer, a Tyman Green interferometer, a Michelson interferometer, and a Fabry-Perot interferometer.